

Boolean model is a basic model in the field of stochastic geometry that provides numerous applications in real life. In this thesis we will present a new method of inference in Boolean models, which uses the Bayesian approach to statistics and Markov Chain Monte Carlo algorithms. We will describe the method in detail, focus on its practical aspects, and compare the method with established classical methods in the case of stationary Boolean models with circular grains. Inference in Boolean models is often challenging, as there is typically an overlap of the grains that make up the Boolean model. The Bayesian method described in this thesis tries to deal with this problem by generating realizations from the aposterior distribution that are visually similar to the observed realization of the Boolean model. Moreover, the advantage of the Bayesian approach is the possibility to extend inference in stationary models relatively easily also for non-stationary models.